# UNDERSTANDING BLOCKCHAIN ADOPTION IN EMERGING MARKETS: INTEGRATING THE TECHNOLOGY ACCEPTANCE MODEL AND INNOVATION DIFFUSION THEORY

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## ABSTRACT

*Blockchain technology has received a lot of interest in recent years because of its potential to disrupt various industries. However, the effective adoption of blockchain technology is dependent not only on the capabilities of the technology itself but also on the attitudes of people toward the technology. Focusing on the roles of perceived usefulness, perceived ease of use, and personal innovativeness, this study aimed to investigate how attitudes affect blockchain technology adoption in an emerging market. The process of designing and verifying the model, which was centered on the Technology Acceptance Model (TAM) and the Innovation Diffusion Theory (IDT), made use of structural equation modeling. The TAM and IDT served as the foundation for the model. The study found that one's attitude has a substantial impact on adoption, and that this impact is enhanced when one's attitude is also related to their perception of the technology's usability and their own propensity for innovation. The survey included 347 professionals from an emerging market. Perceived ease of use and personal innovativeness are moderately mediated by attitude, but perceived ease of use and adoption are strongly influenced by attitude. Multiple factors, such as personal innovativeness, perceived ease of use, perceived usefulness, and attitude, were shown to play significant roles in the early market acceptance of blockchain technology. The findings of this study give important insights for practitioners and policymakers who are striving to stimulate blockchain use and add significantly to the body of research regarding the psychological components that drive blockchain adoption.*

**Keywords**: Blockchain, Technology Acceptance Model, Innovation Diffusion Theory, Attitude, Adoption, Emerging Markets

## INTRODUCTION

Blockchain technology has attracted a lot of attention ever since it was developed as the foundation for digital currencies like Bitcoin (Ramzan et al., 2022). When it comes to recording transactions, blockchain is transparent, secure, and immutable since it is distributed and kept on



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numerous computers (Rawat et al., 2020). Financial services, supply chain management, healthcare, and even governments might all benefit from its implementation (Dahiya et al., 2022). Blockchain's key features, including decentralization, transparency, immutability, and security, addresses many of the challenges faced by traditional centralized systems. By eliminating the need for intermediaries and relying on cryptographic algorithms, blockchain technology offers a trustless and tamper-resistant environment for conducting transactions and sharing information (Lumineau et. al, 2021). In recent years, numerous organizations and governments worldwide have been exploring the adoption and implementation of blockchain technology. However, despite its potential benefits, the widespread adoption of blockchain faces several challenges. While blockchain technology has been widely accepted by professionals and corporate leaders in advanced economies, its adoption in emerging markets is low (Asante et al., 2022; Gillpatrick et al., 2022). Attitude and personal innovativeness toward blockchain technology are significant factors in its widespread acceptance (Chopdar et al., 2018; Kamble et al., 2019).

A person's attitude toward blockchain technology may be defined as their inclination toward or overall opinion of the technology. A variety of elements, like an individual's perceptions about blockchain's value, simplicity of usage, compatibility with already existing systems, and possible risks, can all play a role in shaping that individual's attitude toward the technology. According to (Albayati et al., 2020) research, gaining an understanding of and being able to influence the attitudes of individuals is essential for increasing blockchain technology's adoption and acceptability. In addition, the degree to which an individual is innovative is a crucial factor in determining how quickly new technology are adopted. An individual's inclination to accept and apply new technologies, exhibiting a willingness to take risks and seek creative solutions, is what we mean when we refer to their personal innovativeness. (Chopdar et al., 2018) found that those who score higher on the innovation scale are the ones who are more open to trying out new technologies like blockchain. The present research looks at the nexus between attitude and three subjective measures: perceived ease of use, perceived usefulness, and personal innovativeness. This study explores the connection between attitude and users' perceptions of blockchain technology's ease of use, perceived usefulness, and personal innovativeness taking into consideration the potential of blockchain technology and the importance of people' attitudes and personal innovativeness in its acceptance (Marimuthu et al., 2022). This study investigates the role that attitudes may have in determining the rate of adoption of blockchain. This study fills a gap in the literature by bringing together (Rogers', 1962) innovation diffusion theory and (Davis, 1980) technology acceptance model.

Organizations as well as governments in emerging markets are able to establish strategies to encourage the adoption and deployment of blockchain technology if they first gain knowledge of the factors those impact individuals' attitudes towards blockchain and their personal innovativeness.

The following is the outline for the rest of the paper: The theories used for the study, framework and hypothesis of the study, research methods, results, and findings, and finally the limitations and conclusions.



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## Theoretical Framework

### *Technology Acceptance Model (Tam)*

TAM is a well-known theory in this field of study. Its goal is to provide an explanation for and make predictions about how new technology will be received and used. Originally conceived by Davis in the 1980s, TAM has now seen widespread application and verification across a range of research initiatives in fields as diverse as IT, e-commerce, and mobile apps (Al-Adwan & Smedley, 2013). TAM is predicated on the idea that people's intentions to use technology are strongly influenced by their impressions of the technology's utility and their ease with using it. The perceived usefulness of technology is the extent to which its adoption would boost the user's performance or productivity. Users' perceptions of how simple and straightforward it is to utilize a piece of technology are what "perceived ease of use" refers to, as defined by (Abdullah et al., 2017).

In the context of blockchain adoption, TAM can provide some insight into people's attitudes and motivations. Understanding the factors that affect people's perceptions of blockchain's usability and utility might provide insights into their thoughts on the technology's adoption. According to (Garg et al., 2021), factors such as better transparency, enhanced security, lower transaction costs, and higher efficiency in operations can all have an impact on how helpful blockchain technology is seen to be. People are more likely to have positive views toward the adoption of blockchain technology if they feel that incorporating blockchain technology into their personal or professional life would bring about the aforementioned benefits. The phrase perceived ease of use of blockchain describes how simple individuals think the technology to be. User-friendly interfaces, clear instructions, and access to technical support are all factors that contribute to a consumer's perception of a product's ease of use, as stated by (Shen & Chiou, 2010). If people believe that blockchain can be easily adopted and utilized in a variety of settings, they are more likely to have a positive outlook on its potential applications. Furthermore, TAM proposes that an individual's attitudes about a technology act as a mediator between the individual's perceptions of the technology's utility, ease of use, and adoption propensity. According to the study by (Hau et al., 2019), people's opinions about blockchain can influence whether or not they plan to accept and use it.

TAM has been used widely in many studies on the adoption of various technologies; however its usage in the context of blockchain has been rather limited (Kamble et al., 2019). This study used TAM in order to look at how professionals' perceptions of the technology's utility and usability affect their views on its adoption in an emerging market (Kamble et al., 2019). Previous studies have linked the views of professionals on blockchain technology's viability to its perceived utility and user-friendliness. Previous research has shown that these two factors do have an impact in how professionals perceive blockchain technology. TAM is a powerful theoretical framework that may be used to characterize the perspectives of professionals on the use of blockchain technology in developing economies. TAM contributes to a more nuanced understanding of the elements that influence blockchain adoption through studies of concepts like the perceived utility of blockchain technology, the perceived ease of using blockchain



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technology, and the role that attitude performs as a mediator. Research on the role of attitude and individual innovativeness in blockchain acceptance may be strengthened by using TAM.

### *Perceived Usefulness*

Individuals' opinions regarding the degree to which they believe blockchain technology may improve their performance or meet their requirements are referred to as their perceived usefulness. Individuals are more likely to acquire positive views regarding the adoption of blockchain technology if they think that blockchain delivers practical benefits, such as greater security, transparency, efficiency, or cost savings (Toufaily et al., 2021). Therefore, understanding the potential uses of blockchain and disseminating this knowledge efficiently is crucial to the establishment of positive attitudes.

### *Perceived Ease of Use*

People's confidence in their own ability to grasp and apply blockchain technology lies at the heart of the "perceived ease of use" concept. Individuals' impressions of a technology's ease of use may be impacted by aspects such as the product's user-friendliness, the clarity of its interfaces, and the availability of training and support, as stated by Al-Afeef et al. (2023). People are more inclined to support the widespread use of blockchain when they have the idea that doing so is easy.

### *Innovation Diffusion Theory (IDT)*

The acceptance and spread of innovations within a society are explained by the Innovation Diffusion Theory (IDT) (Rogers, 1962). Over time, IDT examines how people and businesses learn about and implement new ideas (Giovanis et al., 2012). According to IDT, several elements, including the qualities of the adopters themselves, have a role in whether or not a new technology is adopted. As a whole, these elements affect how people feel about and plan to begin implementing new technology (Sana'a, 2016). IDT may shed light on the significance of attitude and individual innovativeness in the context of blockchain adoption.

Although IDT has been used extensively in studies of the diffusion of other types of innovations, its applicability to the spread of blockchain technology has been limited. Using IDT, the current research investigates what elements, if any, in the realm of innovation affect people's willingness to adopt blockchain technology. Attitudes and individual innovativeness are only two of the many elements that influence blockchain adoption, and they are both well-described by the framework provided by Innovation Diffusion Theory (IDT). IDT's research on how people take up new technologies can provide light on how blockchains grow. Integrating IDT into studies of blockchain adoption's impact on attitude and individual innovativeness can strengthen the study's theoretical basis and practical consequences, ultimately leading to more efficient approaches for increasing blockchain adoption.



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### *Personal Innovativeness and Blockchain Adoption*

Individuals who have a high level of personal innovativeness are more likely to embrace and put to use cutting-edge innovations when they become accessible. A person's openness to new experiences and technology is quantified by this concept, as outlined by Mani and Chouk (2018). The degree to which an individual is innovative is a critical aspect in determining how they will respond to the introduction of blockchain technology. One indicator of an individual's innovativeness is their propensity to adopt and make use of cutting-edge technological advancements. It is another major factor that matters for blockchain's future. People who have greater degrees of their own personal innovativeness are more willing to accept and experiment with novel technologies such as blockchain. They are open to change, willing to take risks and exhibit a greater curiosity to explore and adopt new solutions (Khazaei, 2020). Personal innovativeness also contributes to the diffusion of blockchain technology. Innovators and early adopters with high levels of personal innovativeness play a crucial role in creating a buzz around blockchain, promoting its benefits, and encouraging others to adopt it. Their willingness to experiment and be early adopters of blockchain sets the stage for its wider acceptance and subsequent adoption by the majority (Salcedo & Gupta, 2021).

Understanding the significance of personal innovativeness is vital for identifying potential blockchain adopters, developing targeted strategies to engage them, and fostering an innovation-oriented culture within organizations. Encouraging and cultivating personal innovativeness can facilitate the successful integration of blockchain technology and accelerate its adoption and implementation (McNamara & Sepasgozar, 2020). Overall, the significance of attitude and personal innovativeness in blockchain adoption cannot be overstated. Positive attitudes towards blockchain and high levels of personal innovativeness contribute to its successful adoption and diffusion. By acknowledging the significance of these elements, businesses and policymakers are able to devise interventions, strategies, and policies that will assist the successful adoption and exploitation of blockchain technology, encourage positive attitudes, and boost personal innovativeness. Different theoretical frameworks and models, such as IDT and TAM, are used to conceptualize individuals' innovativeness. Individuals' propensity for innovation is highlighted by these models as a key component in determining the spread of new technology (Mun et al., 2006).

### *Attitude*

Attitude toward blockchain technology influences individuals' intentions to adopt and use it. There is a correlation between having positive attitudes and experiencing better acceptance and adoption rates. According to (Shaupp & Festa, 2018), individuals that have a favorable view consider blockchain technology to be worthwhile, productive, and advantageous for both their personal and professional endeavors. When people have a favorable impression of blockchain, they are more likely to be open to learning about and adopting the technology (Lin, 2023). In addition, attitude plays a crucial part in the spread of blockchain technology. As individuals with positive attitudes adopt and share their positive experiences, they act as opinion leaders and influence others' perceptions and attitudes toward blockchain (Kamble et. al, 2019). Thus,



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understanding and influencing individuals' attitudes toward blockchain is critical for its widespread adoption and diffusion across industries. Attitudes play a crucial role in shaping individuals' intentions and behaviors towards adopting new technologies such as blockchain. Understanding the factors that influence attitudes toward blockchain is essential for promoting its adoption.

### *Attitude and Blockchain Technology Adoption*

When people have a favorable impression of blockchain, they are more likely to be open to learning about and adopting the technology (Lin, 2023). These studies have added to our knowledge of the factors that determine individuals' views and intentions toward adopting blockchain technology by shedding light on how individuals are influenced by those factors. To understand public opinion on the introduction of blockchain in banking, (Li & Li, 2017) performed a survey. The study indicated that a person's opinion of blockchain technology was significantly influenced by the belief that it was useful and simple to use. Additionally, confidence and the influence of others played significant roles in the formation of attitudes. According to the findings of the study, persons who had positive attitudes were more likely to demonstrate intent to use blockchain technology for use in financial transactions. (Liu & Xu, 2019) looked at what factors affect how people perceive blockchain in the healthcare context. Trust, perceived ease of use, and perceived benefit were all found to be predictors of participants' positive sentiments of blockchain's potential in the healthcare sector. Positive opinions of blockchain increased as respondents' experience with the technology grew, as shown by the study. The findings showed that teaching individuals about blockchain technology might improve their attitudes and intent to utilize blockchain in healthcare applications. This could be accomplished by providing individuals with more information about blockchain.

(Wang & Chen's, 2020) study surveyed logistics professionals for their thoughts on how blockchain technology may be used in supply chain. The study found that favorable attitudes about blockchain technology adoption were driven by trust, perceived ease of use, perceived benefit, and social influence. The findings underlined the significance of institutional support and teamwork in fostering favorable perceptions of blockchain. (Kshetri & Voas, 2021) conducted a thorough review on blockchain application. According to the findings, there are a variety of elements that contribute to how individuals feel about blockchain. Perceived utility, perceived ease of use, trust, risk, and social effects are all examples of such factors. The analysis also highlighted the need for more research into how individuals' levels of innovativeness and other characteristics affect their perspectives on blockchain acceptance.

According to this research, people's opinions on whether or not to use blockchain are highly influenced by their beliefs about the technology's value, the perceived ease of using the system, their level of trust in the technology, the level of social influence they have over others, and their level of understanding about the technology. A more optimistic outlook is related to a greater possibility of adopting blockchain technology in a variety of industries, including banking, healthcare, logistics, and supply chain management. These sectors include supply chain management.



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## Hypotheses Development

### *Perceived Usefulness*

There have been several empirical studies conducted on the issue of how people's perceptions about blockchain technology influence their openness to adopting those technologies. According to these studies, the importance of blockchain technology significantly affects how people perceive it. (Liang et al., 2017) conducted research on people's intentions to use blockchain technology and looked into their motivations for doing so. The findings showed that people's judgments of how beneficial they felt blockchain technology will be had a substantial influence on their attitudes regarding adoption. Those who saw blockchain technology as having positive applications were more likely to advocate for its wider adoption. (Wang et al., 2019) looked at what motivates people to explore more about how banks might use blockchain technology. According to the results, people's positive attitudes on the adoption of blockchain were significantly influenced by how they perceived the benefit in using the technology. As more people learn about the benefits blockchain may bring to improving operational efficiency, security, and transparency, they become more receptive of its usage.

In the context of digital transactions, (Nguyen & Nguyen, 2020) investigated what motivates individuals to use the technology. The authors concentrated on what makes consumers satisfied with using blockchain. The study's results showed that people's positive attitudes about the implementation of blockchain technology were influenced by their perceptions of the usefulness of the technology. The participants' opinions about the implementation of blockchain technology were most positive when they felt that it might enhance transaction security, lower transaction costs, and increase trust. (Yang et al., 2021) conducted research to determine the factors that motivate people's interest in applying blockchain technology in the medical field. The study's results suggest that people's perceptions of the technology's utility had a significant and positive influence on their views on using blockchain. One possible explanation for the overwhelming optimism around blockchain is the assumption that it may enhance data security, interoperability, and patient privacy. The results of this empirical study suggest that individuals are more inclined to adopt blockchain if they see direct benefits to themselves. People are more inclined to support the broad use of blockchain technology if they believe doing so would improve trust, efficiency, security, transparency, and cost-effectiveness. The results show a favorable correlation between an individual's belief in the value of blockchain technology and their degree of enthusiasm for adopting it. Therefore, the following hypothesis is put forth:

*H1: Perceived usefulness has a positive influence on individuals' attitudes towards blockchain technology*

*H2: Perceived usefulness has a positive influence on individuals' adoption of blockchain technology*

### *Perceived Ease of Use*

Researchers have analyzed how impactful users' perceptions of blockchain's user experience have contributed to their commitment to using the technology. People's intentions of adopting blockchain technology were the focus of a research by (Liang et al., 2017). Users'



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perceptions of the technology's usability had a significant impact on their openness to embracing it as a means to address their problems, as shown by the results. Positive attitudes toward blockchain technology adoption were more common among those who saw the technology as simple to implement. (Wang et al., 2019) investigated what motivates individuals to accept blockchain. The study found that the degree to which consumers believed blockchain technology was easy to use affected their drive for adopting it. Those who found blockchain technology simple to grasp and implement were more likely to advocate for its widespread use. (Nguyen & Nguyen, 2020) investigated what factors influence individuals' interest in adopting blockchain for online transactions. Positive opinions regarding blockchain technology adoption were shown to correlate strongly with respondents' perceptions of the technology's ease of use. Those who found blockchain technology intuitive and straightforward were more likely to favor widespread implementation of the system.

Researchers such as (Yang et al., 2021) looked at what motivates individuals to get interested in using blockchain technology in the medical field. According to the results of the survey, individuals were more willing to implement blockchain technology if they believed it would be easier to do so. Users who thought it would be simple to figure out how to implement blockchain technology in hospital settings were more inclined to advocate for its widespread adoption. If professionals think that the technology will be easy to use, they are more likely to adopt it. Positive attitudes toward blockchain's potential users are more likely to develop when people perceive the technology to be easy and straightforward to work with. These results provide new insight into the importance of user-friendliness when it comes to blockchain adoption. Therefore, the analysis suggests the following hypothesis:

*H3: Perceive ease of use has a positive influence on individuals' attitude to blockchain*

*H4: Perceive ease of use has a positive influence on individuals' adoption of blockchain*

### *Personal Innovativeness*

It has been shown that a person's propensity for innovation is correlated with the degree to which they are willing to utilize blockchain. The purpose of these studies was to obtain actual evidence on how people's propensity for innovation influences their opinions on the adoption of blockchain. To better understand how people form opinions on the use of blockchain, (Dwivedi et al., 2019) concluded that blockchain was most appealing to people who are innovative thinkers and open to new ideas. Innovative individuals were more likely to perceive blockchain technology favorably. (Nguyen & Nguyen, 2020) looked into what makes people interested in using blockchain technology for online transactions. Personal innovativeness has been proven to influence people favorably toward embracing blockchain technology. Positive attitudes toward blockchain adoption were more common among participants who displayed greater degrees of personal innovation and a willingness to try new technologies.

(Wang et al., 2019) investigated the motivations behind individuals' adoption of blockchain technology in the banking industry. The result demonstrates that blockchain is more likely to be adopted by those who are open to new ideas. In this study, participants' attitudes regarding blockchain adoption were found to be positively correlated with their own levels of



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innovation and tendency to adopt new technology. (Lu et al., 2020), investigated what makes people interested in using blockchain-based healthcare services. People's positive sentiments regarding embracing blockchain technology were found to be influenced by their own levels of innovativeness. Innovative participants were more likely to see the implementation of blockchain-based healthcare services favorably.

The results of these empirical investigations consistently support the idea that individuals' propensity for innovation is favorably correlated with their openness to embracing blockchain technology. To this end, we present the next hypothesis:

*H5: Personal innovativeness positively influences individuals' attitudes towards blockchain technology.*

*H6: Personal innovativeness positively influences individuals' adoption of blockchain technology.*

### *The Mediating Role of Attitude*

Experimental research has been conducted to investigate individuals' perceptions and the part they play in determining whether or not to adopt blockchain technology. This study's objective was to evaluate the potential mediating role that one's attitude toward blockchain technology may have on prospective adopters of the technology. (Venkatesh et al., 2012) looked at the factors that contribute to promoting new technology. They came to the conclusion that attitudes had a substantial role in mediating the link between perceived usefulness, perceived ease of use, and the inclination to accept technological innovations. The evidence demonstrates that a person's attitude towards technology mediates the effect that external factors have on one's openness to adopting new forms of technology. (Hsiao & Chen, 2019) investigated the potential uses of blockchain in the banking and finance industries. Their research showed that people's attitudes regarding blockchain technology considerably mediated the connection between its perceived utility, perceived ease of use, and what professionals intend to do with it. People who had a positive impression of blockchain were more likely to adopt it because they saw the value in it and realized how easy it was to implement. To learn more about why people prefer blockchain-based supply chain management systems, (Liu et al., 2020) performed a study. They discovered, in particular, that one's attitude toward blockchain technology influenced the connection between blockchain's perceived utility, ease of use, and acceptance. Those who had a favorable perception of blockchain technology were also more likely to find that it was applicable to real-world situations and easy to put into practice. Researchers Zhang et al. (2020) conducted research on blockchain-based electronic health records. Positive attitudes about blockchain were found to mediate the relationships between blockchain's perceived utility, blockchain's perceived ease of use, and the desire to use blockchain. Those who had a favorable perception of blockchain were more likely to adopt it for the administration of EHR because they believed it to be useful and easy to put into practice. Therefore, the researchers in this study postulated the following hypothesis:

*H7: Attitude mediates perceived usefulness, perceived ease of use, personal innovativeness and blockchain adoption*.



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These hypotheses are predicated on the idea that people's perspectives on the technology's utility, convenience of use, and personal innovativeness influence their attitudes toward adopting blockchain technology. Empirical research on the connections between the aforementioned concepts and blockchain adoption is stated based on the hypotheses. Figure 1

## Conceptual Model

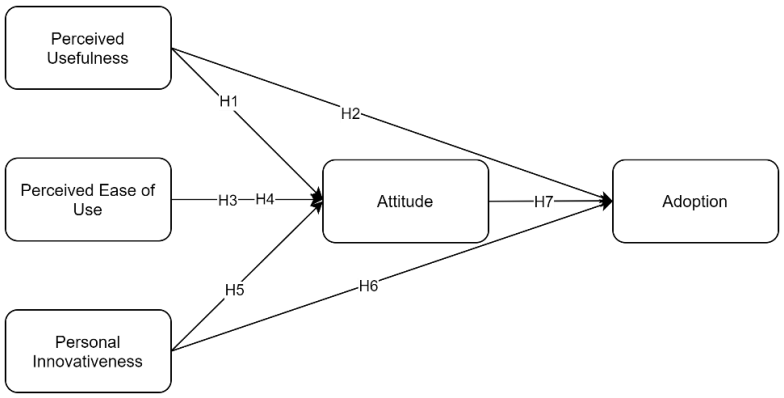


**Figure 1**
**AUTHORS' CONCEPTUALISATION (2023)**

# RESEARCH METHODS

## Research Design

The increased interest in studying blockchain technology is reflected in the calls for research into various aspects of the technology. A further empirical study on the growing popularity of blockchain in emerging markets is needed. We are able to understand how blockchain technology acceptance is affected by these factors since the constructs are based on well-established theories of adoption consisting of TAM and IDT. With the independent variables explaining adoption, the empirically verified model is a helpful addition to the current body of research due to its strong explanatory power. Second, we add to the blockchain adoption literature by integrating TAM and IDT into a single, testable model.

Attitude, personal innovativeness, perceived usefulness, and perceived ease of use are the factors that were examined in this study to understand their potential impact on blockchain adoption. A quantitative cross-sectional approach was chosen as the most appropriate for this investigation. This approach enables the gathering and examination of numerical data, which can then be used to investigate the correlations between variables and validate the hypotheses that have been provided. In order to acquire the necessary information for the quantitative analysis, an online survey was conducted. In addition to saving time and costs, conducting a survey online has the added benefit of eliminating geographical barriers. Researchers (Kamble et al. 2019), used an online survey in a similar study.



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## Research Participants and Procedures

The increased interest in studying blockchain technology is reflected in the requests for research into various aspects of the technology. Our research contributes in two ways to the current literature. More empirical study on the widespread use of blockchain in emerging markets is needed. This study set out to investigate which factors play a role in professionals' responsiveness to blockchain technology. Since the constructs are founded on established adoption theories like TAM and IDT, in this way, we can see how they affect blockchain implementation. With the independent variables explaining adoption, the empirically verified model is a helpful addition to the current body of research due to its strong explanatory power. Second, we add to the blockchain adoption literature by integrating TAM and IDT into a single, testable model.

This research looked at a representative sample of 347 professionals working in Accra and Tema, (Ghana) two of the country's most important urban centers located in the Greater Accra area. The first sample was comprised of a total of 486 respondents, each of whom represented a company that was found in the database of the Ghana Club 100. The researchers asked individuals to respond to a survey through email. Participants received periodic updates via email from the researchers and their involvement in the study was entirely voluntary. The survey was given out to key informants, and they had to have worked with blockchain for at least three years and be operating in Supply Chain Management, Marketing, Sales, Procurement, Manufacturing, Logistics/Transportation, or Warehousing department. The survey included guidelines requesting that participants only submit replies if they were familiar with blockchain (BC) and its use in their specific field of work was undertaken to strengthen the test's content validity. This request was made in the instrument. The total number of participants in our survey was 347, and they came from 80 different organizations in the manufacturing, service, information technology, and logistics industries. The research site was selected for a variety of reasons. Businesses in Ghana are increasingly interested in adopting blockchain technology, creating an immediate need for researchers to investigate the phenomenon. Second, because of the challenges that these organizations' managers face when attempting to implement blockchain technology, it is important to study how managers' perceptions of the technology's usability, utility, and personal innovativeness influence their decisions to adopt it. For this reason, the participants in the research focused on Ghanaian middle-level managers. The online survey was taken by respondents during the months of January 2022 and May 2023. Purposive sampling was used to distribute the questionnaires to relevant groups who could provide useful information. These participants include people who work in sectors linked to blockchain, people who use blockchain technology, and those who are knowledgeable about blockchain technology. SPSS version 23 was used for the statistical analysis. Minimum requirements for SEM analysis (Comrey & Lee, 1992; Tabachnick & Fidell, 2007) are met by the 71.4% response rate from the sample of 347 participants. (Comrey & Lee, 1992) determined the minimum necessary requirement. It has also been proposed that SEM analysis may be carried out successfully with a very small sample size (Sideridis et al., 2014; Wolf et al., 2013). It has been established that SEM analysis can be performed with a sample size of 347 managers. This result was reached



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after considering the difficulties of doing research on a novel issue like blockchain technology's use.

The questionnaire underwent pre-testing by distributing sample questions to 15 individuals whose areas of expertise were connected to blockchain applications (Preneger et al., 2015). This was done to make sure the questions were easy to understand. The researchers found that all the items on the survey instrument were understood appropriately by respondents because the pre-test results were positive. In conclusion, the potential problems caused by the common method variance (CMV) were addressed by employing the Harman single-factor test, which was established by (Podsakoff et al., 2003). As a result of the finding that no one factor's 'variance explained' was lower than the adequacy standard of 50%, the researchers concluded that there were no CMV issues associated with the dataset.

## Instrument Development

According to (Nunnally & Bernstein, 1994) & (Churchill, 1979), a successful instrument developed for the purposes of research should completely include the information connected to each construct. Items used to assess one construct should not conflict with those used to evaluate another construct, but all components used to assess an individual construct ought to be consistent with one another (Kamble et al., 2019). The study model shown in Figure 1 was evaluated using a survey constructed on the basis of previous research. Scales and items from prior studies were employed in both the TAM and the DIT. Using a 5-point Likert Scale with interval levels ranging from "strongly disagree" to "strongly agree," the responses of middle-level managers in private businesses were analyzed. Appendix 1 contains further information on the constructs being measured.

## Data Analysis

To evaluate the links between the independent variables on adoption, a statistical analysis was performed with the aid of the smart PLS version 4.0 software (Ringle et al., 2022). We chose this approach to analyse the data because, managing various modeling issues is easier with PLS-SEM than with the challenging and rigorous assumptions associated with the use of multivariate statistics (Boonlertvanich, 2019).



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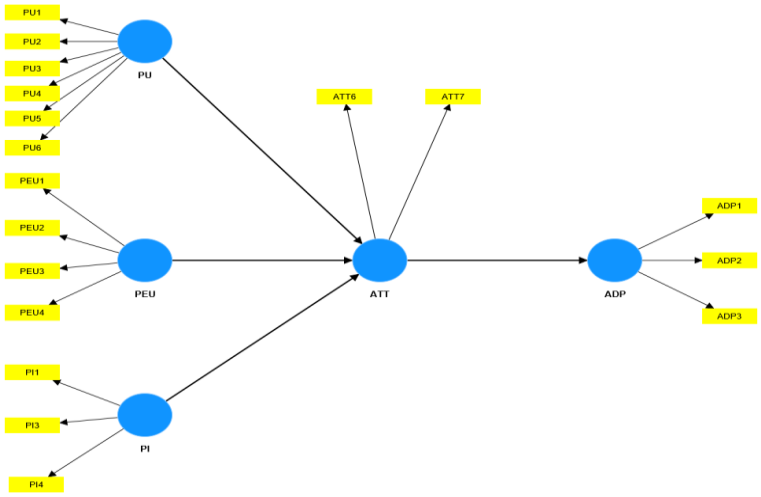


**Figure 2**
**MEASUREMENT MODEL: FIELD DATA (2023)**

As a means of ensuring the reliability of the study results, (Hair et al., 2019) proposed that indicators measuring a construct in the structural model must be 0.60 for an exploratory study and 0.70 for research that relies on established constructs. This is because the indicator elucidates more than 50 percent of the indicator variance. This study used established constructs from existing studies and therefore performed a reliability test using the minimum criterion of 0.70 in light of the indicators.

## Analysis of the Measurement Models

We analyzed both the measurement and structural models with PLS-SEM. The conceptual framework of this investigation included the following five factors: perceived usefulness, perceived ease of use, personal innovativeness, attitude, and adoption. The measuring model (Rmayah et al., 2018; Hair et al., 2019; Hanafiah, 2020) was analyzed by measuring the reliability, validity, and discriminant validity of the five constructs. All three measures of reliability (Cronbach's alpha, rho_a, and rho_c) need to be above 0.7 in order to conclude that a construct may be reliable. The average variance extracted (AVE) must be more than 0.5 to demonstrate convergent validity, as stated by Hair et al. (2017).

**Table 1**
**CONSTRUCT RELIABILITY**
**(Cronbach alpha, Composite Reliability Rho_a and Composite Reliability rho_c)**

| | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|---|---|---|---|---|
| ADP | 0.703 | 0.757 | 0.823 | 0.608 |
| ATT | 0.797 | 0.799 | 0.908 | 0.831 |
| PEU | 0.806 | 0.807 | 0.874 | 0.636 |
| PI | 0.735 | 0.793 | 0.843 | 0.643 |



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| | | | | |
|---|---|---|---|---|
| PU | 0.932 | 0.939 | 0.946 | 0.744 |

**Note:** ADP = Adoption, ATT = Attitude, PEU = Perceived ease of use, PI = Personal innovativeness, PU = Perceived usefulness.

The increased interest in studying blockchain technology is reflected in the calls for research into various aspects of the technology. There are two ways in which our study adds to the existing body of knowledge. Additional studies on the widespread use of blockchain in emerging markets are needed. This study set out to investigate the variables that play a role in professionals' adoption of blockchain technology. We are able to understand how blockchain technology acceptance is affected by these factors since the constructs are based on well-established adoption theories (TAM and IDT). With the independent variables explaining adoption, the empirically verified model is a helpful addition to the current body of research due to its strong explanatory power. Second, we add to the blockchain adoption literature by integrating TAM and IDT into a single, testable model.

The results of this investigation show in Table 1 that the items and constructs utilized in this study have appropriate levels of convergent validity and reliability on each of the five items that were included in this study. We evaluated the discriminant validity using the Heterotrait-monotrait (HTMT) ratio, which is the approach that is considered to be the most conservative (Henseler et al., 2015). Recent research has shown that the heterotrait-monotrait ratio, also known as the HTMT ratio, is an improved assessment criterion in contrast to other standard evaluation procedures, such as the Fornell-Larcker criterion and the cross loading criterion (Henseler et al., 2015). This was demonstrated by comparing the HTMT ratio to the Fornell-Larcker criterion and the cross-loading criterion. It is necessary for each construct's HTMT ratio to be lower than 0.9 in order to demonstrate discriminant validity. (Henseler et al., 2015). Table 2 presents the results of the HTMT, which demonstrate a level of discriminant validity that is considered to be good.

**Table 2**
**DISCRIMINANT VALIDITY ASSESSMENT (HTMT)**

| | ADP | ATT | PEU | |
|---|---|---|---|---|
| ATT | 0.211 | | | |
| PEU | 0.092 | 0.726 | | |
| PI | 0.187 | 0.534 | 0.675 | |
| PU | 0.197 | 0.569 | 0.845 | 0.629 |

## Analysis of the Structural Model

The structural model was reported using the 5,000 - bootstrapping resampling approach and the PLS - to predict from the Smart PLS algorithm. The structural model must be analyzed to determine the interaction between perceived usefulness, perceived ease of use, personal innovativeness, attitude, and adoption. As a result, the study's hypotheses were put to the test. In order to assess the structural model, the significance of the path coefficients, as well as the R-



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squared (R2) and Stone-Geisser criteria (Q2) for adoption, should be examined (Hair et al., 2017). In the behavioral sciences, R2 values of 0.368 are considered medium (Rasoolimanesh et al., 2017). This means that customer attitude explains 36.8% of the three predictors. The explained variation was more than the minimal R2 value of 25% (hair et al., 2016).

According to Ali et al. (2018), the value of Q2 must be more than zero to demonstrate that a structural model is predictive; in this case, we discovered a Q2 value of 0.346. These figures show how well the model predicts. According to the current literature (Ali et al., 2018), bias-corrected (BCa) confidence intervals should be employed to assess the significance of the route coefficient. Consumer attitudes are positively influenced by perceived usefulness, perceived ease of use, and perceived innovativeness. It is worth noting that perceived ease of use affected professionals' attitudes the most, followed by personal innovativeness and perceived usefulness.

## Hypotheses Testing

A non-parametric bootstrapping with 5,000 replications was performed to evaluate the hypotheses presented in table 3 (Hair et al., 2016). Three of the four hypotheses were supported as a result of the direct effect: attitude to adoption (= 0.172, p0.05), perceived ease of use to attitude (= 0.425, p0.05), and personal innovativeness to attitude (= 0.156, p0.05). However, the relationship between perceived usefulness and attitude (= 0.104, p=0.252) was not established (table 3). The study also looked at the effect size (f2), which is used to determine if a certain exogenous construct has a significant impact on an endogenous variable. According to Cohen's (1988) advice, the research results demonstrate that perceived ease of use and personal innovativeness have a minor effect size on professionals' attitudes. However, perceived usefulness has little influence on professional's attitudes. Furthermore, attitude has little impact on adoption.

**Table 3**
**HYPOTHESES TESTING**

| | Original sample (O) | F-Squared (f2) | T statistics (\|O/STDEV\|) | P values | Decision |
|---|---|---|---|---|---|
| ATT -> ADP | 0.172 | 0.030 | 2.467 | 0.014 | Supported |
| PEU -> ATT | 0.425 | 0.122 | 5.043 | 0.000 | Supported |
| PI -> ATT | 0.156 | 0.026 | 2.801 | 0.005 | Supported |
| PU -> ATT | 0.104 | 0.007 | 1.146 | 0.252 | Not Supported |

## Mediation Effect

The purpose of this research was to test a hypothesis involving the mediating effect of professionals' attitudes on the relationships between perceived usefulness, perceived ease of use, personal innovativeness, and adoption. (Hair et al., 2017) postulated that, when a mediation variable intervenes between two other related concepts, mediation occurs.



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An estimation of the mediation effect was used in this case. It is worth noting that attitude has no significant mediation impact on the association between perceived usefulness and adoption (= 0.018, p = 0.327). However, attitude has no significant mediation impact on the link between perceived ease of use and adoption (= 0.073, p>0.05). Furthermore, attitude has no significant mediation impact on the connection between personal innovativeness and adoption (= 0.027, p = 0.072) (Table 4).

**Table 4**
**MEDIATION EFFECT**

| | Original sample (O) | T statistics (\|O/STDEV\|) | P values | Decision |
|---|---|---|---|---|
| PU -> ATT -> ADP | 0.018 | 0.981 | 0.327 | Not Supported |
| PEU -> ATT -> ADP | 0.073 | 2.020 | 0.043 | Supported |
| PI -> ATT -> ADP | 0.027 | 1.798 | 0.072 | Not Supported |

## DISCUSSION AND CONCLUSION

The study's goal was to investigate the nexus between the value that is perceived by professionals, perceived ease of use, personal innovativeness, attitude, and adoption. Researchers observed significant links between positive attitudes and adoption, perceived ease of use, and personal innovativeness. There was no link observed between perceived usefulness and attitude.

The increased interest in studying blockchain technology is reflected in the requests for research into various aspects of the technology. There are two ways in which our study adds to the existing body of knowledge. More research on the widespread use of blockchain in emerging markets is needed. This study set out to investigate what elements play a role in professionals' responsiveness to blockchain technology. Since the concepts are based on proven adoption theories like TAM and IDT, we understand how they influence the widespread adoption of blockchain technology. With the independent variables explaining adoption, the empirically verified model is a helpful addition to the current body of research due to its strong explanatory power. Second, we add to the blockchain adoption literature by integrating TAM and IDT into a single, testable model.

It is notable that perceived ease of use had a significantly larger influence on attitude than did perceived usefulness or personal innovativeness. Perceived ease of use is one of several factors that might affect the rate at which technology is adopted (Wamba et al., 2020). A technology's "perceived ease of use" refers to the amount of work a user anticipates putting into learning and using the technology (Davis, 1989). Additionally, the notion that the technology is easy to use influences both user attitudes and technology adoption (Sohaib et al., 2019). Since people's willingness to accept blockchain technology is largely dependent on how simple it is to use, this is an important aspect that is commonly highlighted (Grover et al., 2019). Personal innovativeness is defined by (Dwivedi et al., 2023) as a significant degree of change in practitioners' day-to-day actions in response to new technologies. Attitude is widely recognized as a major factor in whether or not people accept new technologies. This suggests that an



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optimistic attitude toward new technology may play a crucial role in its widespread adoption. According to research (Hussain, 2017), people who are better equipped psychologically to utilize a certain piece of technology are more likely to do so.

To test the hypotheses, we looked at how respondents rated the perceived ease of use and their own innovativeness, and we can observe from Table 3 that both factors had a significant, positive effect on attitude. This indicates that professionals who believe technology is user-friendly and creative will have a positive attitude towards blockchain technology. Furthermore, there is a considerable positive association between attitude and adoption. Professionals with a positive mindset are more inclined to accept new technology. Following is a hypothesis that seeks to ascertain the importance of attitude as a mediator in the connection between perceived usefulness, perceived ease of use, personal innovativeness, and adoption. Perceived usefulness, personal innovativeness, and adoption are all linked in Table 4, with attitude playing a somewhat mediating role. Perceived ease of use is correlated with adoption; however, attitude is a major factor in this relationship. The connection between perceived ease of use and adoption is strengthened as a result of attitude's mediating effect. Finally, human ingenuity, simplicity of use, utility, and attitude are all crucial elements in the spread of blockchain technology. Personal inventiveness influences people's eagerness to adopt new technology and people's impressions of blockchain's usability and value are impacted by those impressions. Adoption attitudes influence the relationship between the aforementioned factors and actual adoption actions. Businesses and regulators looking to encourage blockchain use must have a firm grasp of these factors. Improving blockchain acceptance and usage requires addressing public perceptions of the technology's usability and utility and encouraging an optimistic outlook.

## Implications

### *Theoretical Implications*

The increased interest in studying blockchain technology is reflected in the requests for research into various aspects of the technology. There are two ways in which our study adds to the existing body of knowledge. More empirical research on the widespread use of blockchain in emerging markets is needed. This study set out to investigate which factors play a role in professionals' openness to blockchain technology. The constructs are grounded on proven adoption theories like TAM and IDT, allowing us to comprehend how they influence the general public's reception of blockchain technology. With the independent variables explaining adoption, the empirically verified model is a helpful addition to the current body of research due to its strong explanatory power. Second, we add to the blockchain adoption literature by integrating TAM and IDT into a single, testable model. The increased interest in studying blockchain technology is reflected in the requests for research into various aspects of the technology. There are two ways in which our study adds to the existing body of knowledge. Additional research on the widespread use of blockchain in emerging markets is needed. The focus of this study was on understanding what makes people adopt blockchain technology. Because the models are grounded in established adoption theories like TAM and IDT, we obtain insight into the ways in which these elements influence the widespread adoption of blockchain technology in developing



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economies. With the independent variables explaining adoption, the empirically verified model is a helpful addition to the current body of research due to its strong explanatory power. Second, we add to the blockchain adoption literature by integrating TAM and IDT into a single, testable model. The growing number of calls for studies of various areas of blockchain technology is indicative of the study of the adoption of blockchain technology. Our research contributes to the body of knowledge in two ways. To begin, there needs to be more empirical research into the rapid adoption of blockchain technology in developing economies. The focus of this study was to identify the elements that contribute to the widespread adoption of blockchain technology in the business world. Since the constructs are based on existing adoption theories like TAM and IDT, we understand how they influence the adoption of blockchain technology. With the independent variables explaining adoption, the empirically verified model is a helpful addition to the current body of research due to its strong explanatory power. Second, we add to the blockchain adoption literature by integrating TAM and IDT into a single, testable model. The results show that TAM and IDT conceptualizations have substantial effects on professionals' attitudes about using blockchain technology. This research provides empirical support for the notion that TAM and IDT factors should be prioritized in efforts to increase professionals' blockchain adoption. We anticipate that this study will lay the groundwork for and drive a plethora of future investigations on the adoption of blockchain technology in developing economies.

### *Practical Implications*

Several practical implications may be drawn from this study's findings. First, businesses and governments need to create awareness and education campaigns to help the general public learn more about blockchain and its applications. Positive attitudes toward blockchain may be influenced and adoption rates increased by disseminating easy-to-understand information about its benefits and ease of usage. Organizations should ensure that user-friendly interfaces and intuitive designs of blockchain applications can overcome potential usability barriers. By making blockchain technology more accessible and user-friendly, organizations can encourage individuals with varying technological backgrounds to adopt blockchain. Organizations should provide training and support programs to help individuals develop the necessary skills and confidence to use blockchain effectively. By addressing the knowledge gap and providing ongoing assistance, organizations can facilitate the adoption process and alleviate potential concerns or hesitations. This research shows that individuals' attitudes and level of innovativeness play significant roles in determining whether or not they plan to utilize blockchain technology. Organizations, policymakers, and other stakeholders can benefit from a deeper understanding of these factors as they work to develop strategies to increase blockchain adoption. By fostering positive attitudes, encouraging personal innovativeness, and addressing usability concerns, the successful implementation and adoption of blockchain can be facilitated, leading to its broader societal and economic impact.

## Limitations and Recommendations for Future Research

This study, like any other scientific study, has limitations. For the interest of future studies, qualitative inquiry into the factors that influence blockchain adoption, be carried out not



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only to progress theory but also to design industry strategies that will enhance adoption of new technology and increase profitability. In retrospect, we should have gathered more demographic information, such as the location of professionals. The culture, and ethnicity of professionals, for instance, has not been taken into account, despite the fact that prior research has demonstrated that these cultural norms may affect adoption. The outcomes of this study may be expanded upon by carrying out other studies on the effect of attitude and individual innovativeness on blockchain adoption. Future studies may examine how factors like social norms, trust, security, and regulation affect blockchain adoption. To further increase the generalizability of the results, research might be undertaken in a variety of sectors and cultural settings. It is recommended that future studies expand their scope beyond this area by conducting comparative studies. Future research may also need to compare the rate of blockchain adoption in countries where its use is encouraged by the government with that in nations where such usage is met with skepticism. Future research might also benefit from examining the mediating effect of perceived usefulness between perceived ease of use and readiness to adopt blockchain. Data immutability, shared access, and decentralization are just a few of the features that might be added to the blockchain framework with more research.

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